

WHAT IS CLAIMED IS:

1 **1.** A composition comprising a non-covalent association complex of:
2 a) a positively-charged backbone; and
3 b) at least two members selected from the group consisting of:
4 i) a first negatively-charged backbone having a plurality of attached
5 imaging moieties;
6 ii) a second negatively-charged backbone having a plurality of attached
7 targeting agents;
8 iii) at least one member selected from the group consisting of RNA, DNA,
9 ribozymes, modified oligonucleotides and cDNA encoding a
10 selected transgene;
11 iv) DNA encoding at least one persistence factor; and
12 v) a third negatively-charged backbone having a plurality of attached
13 biological agents;
14 wherein said association complex carries a net positive charge and at least one of said two
15 members from group b) is selected from groups i), iii) or v).

1 **2.** A composition in accordance with claim 1, wherein said biological
2 agent is a therapeutic agent.

1 **3.** A composition in accordance with claim 2, wherein said
2 therapeutic agent is selected from the group consisting of VEGF, botulinum toxin, a
3 blocker of VEGF, and insulin.

1 **4.** A composition in accordance with claim 1, wherein said biological
2 agent is a cosmeceutical agent.

1 **5.** A composition in accordance with claim 4, wherein said
2 cosmeceutical agent is Epidermal growth factor.

1 **6.** A composition in accordance with claim 1, comprising at least
2 three members selected from groups i) through v).

1 **7.** A composition in accordance with claim 1, comprising at least one
2 member from each of groups i), ii), iii) and iv).

- 1 8. A composition in accordance with claim 1, comprising at least one
2 member from each of groups i) and ii).
- 1 9. A composition in accordance with claim 1, comprising at least one
2 member from each of groups ii), iii) and iv).
- 1 10. A composition in accordance with claim 1, wherein said positively-
2 charged backbone has a length of from about 1 to 4 times the combined lengths of said
3 members from group b).
- 1 11. A composition in accordance with claim 1, wherein said positively-
2 charged backbone comprises a polymer having attached positively charged branching
3 groups.
- 1 12. A composition in accordance with claim 11, wherein said polymer
2 is a peptide and said positively charged branching groups are selected from the group
3 consisting of $-(\text{gly})_n\text{-arg-arg-arg-arg-arg-arg-arg}$, HIV-TAT and fragments thereof,
4 wherein the subscript n is an integer of from 0 to 20.
- 1 13. A composition in accordance with claim 12, wherein n is an integer
2 of from 0 to 8.
- 1 14. A composition in accordance with claim 12, wherein n is an integer
2 of from 2 to 5.
- 1 15. A composition in accordance with claim 12, wherein said HIV-
2 TAT fragment has the formula $(\text{gly})_p\text{-RGRKKRRQRRR}-(\text{gly})_q$, wherein the subscripts p
3 and q are each independently integers of from 0 to 20, and said HIV-TAT fragment is
4 attached to said positively charged backbone via either the C-terminus or the N-terminus.
- 1 16. A composition in accordance with claim 15, wherein the subscripts
2 p and q are each independently integers of from 0 to 8.
- 1 17. A composition in accordance with claim 15, wherein the subscripts
2 p and q are each independently integers of from 2 to 5.

1 **18.** A composition in accordance with claim 11, wherein said polymer
2 is a polylysine and said positively charged branching groups are attached to the lysine
3 sidechain amino groups and are selected from the group consisting of -gly-gly-gly-arg-
4 arg-arg-arg-arg-arg and HIV-TAT.

1 **19.** A composition comprising a non-covalent association complex of a
2 positively-charged backbone having at least one attached efficiency group and at least one
3 nucleic acid member selected from the group consisting of RNA, DNA, ribozymes,
4 modified oligonucleotides and cDNA encoding a selected transgene.

1 **20.** A composition in accordance with claim 19, wherein said
2 positively charged backbone is polylysine.

1 **21.** A composition in accordance with claim 19, wherein said
2 efficiency group is selected from the group consisting of $(\text{Gly})_{n1}-(\text{Arg})_{n2}$, wherein the
3 subscript $n1$ is an integer of from 3 to about 5, and the subscript $n2$ is an odd integer of
4 from about 7 to about 17, and TAT domains.

1 **22.** A composition in accordance with claim 19, wherein said
2 positively charged backbone having at least one attached efficiency group is a 150,000 to
3 300,000 polylysine backbone having a plurality of attached Gly_3Arg_7 groups wherein the
4 degree of lysine saturation is from about 5% to about 30%.

1 **23.** A composition in accordance with claim 19, wherein said nucleic
2 acid member is cDNA encoding a selected transgene.

1 **24.** A composition in accordance with claim 19, wherein said nucleic
2 acid member is part of a plasmid that expresses a detectable product.

1 **25.** A composition in accordance with claim 24, wherein said
2 detectable product is a fluorescent protein.

1 **26.** A composition in accordance with claim 24, wherein said
2 detectable product is a blue fluorescent protein.

1 **27.** A composition in accordance with claim 24, wherein said plasmid
2 further comprises a CMV promoter.

1 **28.** A method for delivery of a biological agent to a cell surface in a
2 subject, said method comprising administering to said subject a composition comprising:

3 (a) a positively charged backbone;

4 (b) at least one biological agent selected from the group consisting of:

5 (i) a first negatively charged backbone having a plurality of attached
6 imaging moieties;

7 (ii) at least one member selected from the group consisting of RNA,
8 DNA, ribozymes, modified oligonucleotides and cDNA
9 encoding a selected transgene; and

10 (iii) a third negatively charged backbone having a plurality of
11 attached therapeutic agents; and

12 (c) a second negatively charged backbone having a plurality of attached
13 targeting agents;

14 wherein said composition is a non-covalent association complex of said positively
15 charged backbone, said biological agent and said second negatively charged backbone
16 having a plurality of attached targeting agents, and carries a net positive charge.

1 **29.** A method in accordance with claim **28**, wherein said biological
2 agent is an oligonucleotide or a cDNA encoding a selected transgene, and said
3 composition further comprises DNA encoding at least one persistence factor.

1 **30.** A method in accordance with claim **28**, wherein said biological
2 agent is a first negatively charged backbone having a plurality of attached imaging
3 moieties.

1 **31.** A method in accordance with claim **28**, wherein said biological
2 agent is a third negatively charged backbone having a plurality of attached therapeutic
3 agents.

1 **32.** A method in accordance with claim **28**, wherein said administering
2 is intravenous.

1 **33.** A method in accordance with claim **28**, wherein said administering
2 is transdermal.

1 34. A method in accordance with claim 28, wherein said administering
2 is carried out using an angioplastic balloon.

1 35. A method in accordance with claim 28, wherein said administering
2 is carried out using a catheter.

1 36. A method in accordance with claim 28, wherein said administering
2 is intraperitoneal.

1 37. A method in accordance with claim 28, wherein said composition
2 is in a gel formulation.

1 38. A method for preparing a pharmaceutical composition, said method
2 comprising combining a positively charged backbone component and at least two
3 members selected from the group consisting of

4 i) a first negatively-charged backbone having a plurality of attached
5 imaging moieties;

6 ii) a second negatively-charged backbone having a plurality of attached
7 targeting agents;

8 iii) at least member selected from the group consisting of RNA, DNA,
9 ribozymes, modified oligonucleotides and cDNA encoding a
10 selected transgene;

11 iv) DNA encoding at least one persistence factor; and

12 v) a third negatively-charged backbone having a plurality of attached
13 therapeutic agents;

14 with a pharmaceutically acceptable carrier to form a non-covalent association complex
15 having a net positive charge, with the proviso that at least one of said two members from
16 groups i) through v) is selected from groups i), iii) or v).

1 39. A kit for formulating a pharmaceutical delivery composition, said
2 kit comprising a positively charged backbone component and at least two members
3 selected from the group consisting of

4 i) a first negatively-charged backbone having a plurality of attached
5 imaging moieties;

- 6 ii) a second negatively-charged backbone having a plurality of attached
- 7 targeting agents;
- 8 iii) at least one member selected from the group consisting of RNA, DNA,
- 9 ribozymes, modified oligonucleotides and cDNA encoding a
- 10 selected transgene;
- 11 iv) DNA encoding at least one persistence factor; and
- 12 v) a third negatively-charged backbone having a plurality of attached
- 13 therapeutic agents;
- 14 and instructions for preparing said pharmaceutical delivery composition.